

Nuisance Animal Controller
By: Ralph E. Arnold

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0001 APPLICATION TO U.S. PATENT OFFICE FOR: Utility Patent

0002 NAME AND REGISTRATION NUMBER OF ATTORNEY OR AGENT AND
DOCKET NUMBER (IF APPLICABLE): None

0003 U.S. GOVERNMENT AGENCY THAT HAS PROPERTY INTEREST IN THE
APPLICATION: None

0004 FIELD OF INVENTION: This invention relates to the field of battery powered
electrical repelling and training devices to deter and/or retrain nuisance behaviors
in animals.

0005 SPECIFICATIONS:

0006 (1.) DESCRIPTIVE TITLE OF THE INVENTION: A portable animal
repelling and training device using a battery powered electrical current to the
specialized internal switching mechanism to produce an electrical shock that I call a
nuisance animal controller.

0007 (2.) CROSS REFERENCE TO RELATED APPLICATIONS (IF ANY):

3,713,580	Mickleson	January 1973	231/7
5,009,912	Burman & Burman	April 1991	119/720
5,451,239	Sewell & Fadil	September 1995	47/1.01R
5,892,446	Reich	April 1999	340/573
5,894,818	Betzen	April 1999	119/712
6,014,951	Betzen	January 2000	119/712
6,016,100	Boyd & Frankewich	January 2000	340/384.2
6,192,621	Fain	February 2001	43/131

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0008 (3.) FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT: None

0009 (4.) REFERENCE TO SEQUENCE LISTING: Not Applicable

0010 (5.) BACKGROUND OF THE INVENTION: As human populations have increased and enlarged their living space, so have interactions with wildlife. Many of these wildlife have lost their natural fear of people and in pursuit of an easy meal bring injury to and damage property of the human population.

0011 Controlling damage caused by nuisance wildlife is a problem most people have been or will be forced to deal with during their lifetime. Various attempts have been made to keep nuisance animals from destroying property ranging from the use of sound (5,892,446; Reich), ultra sonic tones (6,016,100; Boyd and Frankewich), and jets of water (5,009,192; Burman & Burman) to frighten nuisance animals away, to the use of devices which cause physical discomfort to the animal such as foul odors (6,192,621; Fain) and placement of grid work in an area to cause discomfort to the feet of animals (5,451,239; Sewell & Fadil), to the use of electricity as in the idea of the electric fence (3,713,580; Mickleson) and the using of exposed bare electrodes (5,894,818 and 6,014,951; Betzen). Most nuisance animals are not discouraged for long by odors or sounds used to scare them. However, the use of electrical devices have been by far the most successful in deterring unwanted animals.

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0012 I grew up on a farm and knew that electricity had been used to control animals for years. I did not have electricity at my cabin so knew I would have to depend on battery for my source of power. In addition, I was not available on a daily basis to make sure the battery was working. So I decided I would have to develop a way to power the unit I would invent at the time it was needed only as opposed to powering a unit 100% of the time.

0013 My father was an auto mechanic by trade so I had been playing around with vibrator coils from the time I was a boy. I figured that if I could work up a mechanism utilizing the vibrator coil idea, that I would be able to give the bear a shock if he touched a metal surface in trying to get at the bird feeders and I would get the bears to leave my feeders alone.

0014 Historically, bears, like most nuisance animals, quickly figure a way to get around man's attempts to protect his property. This invention came about in an attempt to stop nuisance bears from destroying my seed filled bird feeders. I believed there had to be a way to deal with the problem so called the Wisconsin Department of Natural Resources Game Warden to get advice. Removing the feeders in the spring and fall when bears are at their worst was the only resolution offered to deal with their nuisance behaviors. Furthermore, he informed me, there was nothing he knew of that had been proven successful in getting bears to

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leave the feeders alone. So I set out to solve the problem on my own. I chose to approach it on my previous experience by combining the mechanics of the automobile and the use of electricity from my father's teachings to solve the problem.

0015 This invention is superior to sound producing ideas in that there is nothing for the animal to "get used to" and learn to ignore. Animals are quite content to graze by a busy roadside or train tracks and become accustomed to ignoring the noises. They are also surprisingly witty in figuring out why they have been scared off in a situation and set about the task of getting around it.

0016 This invention is superior to other ideas that use electricity. The unit operates in complete silence so that there is nothing to alert an animal to possible danger. There is no sound such as a buzz, or sensation such as the tingling sometimes produced with electrically powered products. That is because this unit does not receive power through the internal specialized switching mechanism I invented until the disk has been moved. Additionally, its total silence until the offender has made contact with the disk and received the shock adds the feature of surprise and leaves the animal confused as to what has happened and why. The natural instinct is to get away and stay away. Occasionally, a few diehards will try to get around the unit, but they too have proven themselves to be unsuccessful in field testing.

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0017 (6.) BRIEF SUMMARY OF THE INVENTION: The purpose of this invention is to deliver an electrical shock to nuisance animals. It is intended to either retrain nuisance behaviors or to run them off altogether where necessary.

0018 The invention is powered by a 12-volt battery to produce an electrical shock to the offender. Due to the advantages in my unique internal switching mechanism, it is impossible for the animal to avoid being shocked when it comes into contact with the unit.

0019 The invention does not receive power until the disk is moved thus eliminating the issue of draining the battery of its power when not in use. It also eliminates the need for a recharging system (generator).

0020 The invention consists of a flat sheet metal disk mounted atop a center pipe, relay, condenser, and various wiring configurations in a protective housing, with the coil going through the protective housing and a 12-volt battery in battery holder mounted to the center pipe.

0021 The invention can be used with or without bait. If the offender is destroying property to get to food, in a beehive for example, the unit can be used without bait and installed on top of the beehive in the animal's way to get to the prize. With the unit installed on top of the hive, the animal cannot get to the honey without first making contact with the unit, the animal will be shocked and as

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documented in field testing, it will run off. If the offender is used to being fed, placing food on top of the disk surface will entice the animal disk. In this case, the animal will be shocked on the tongue which is one of the most sensitive parts of the body, and will leave the area all together. I am still in the field testing stage of my invention and am making remarkable, documented progress in determining my invention to be successful.

0022 The invention can be altered to use with most nuisance animals. If dealing with a bear, as I have been in my trials, one would use a more stiff rubber matting in the center than one would use to deal with squirrels or chipmunks. The size and gauge of the sheet metal disk can be altered, again for dealing with animals of different sizes and strengths. The shape of the disk can be altered for use in different situations. For example, if you are protecting a bird feeder from nuisance animals, the proper configuration of the disk would be round and installed on the feeder pole below the feeder. But if one is attempting to protect a beehive from nuisance animals, for example, a square 'disk' would be more appropriate due to the large size it would require to fully cover the surface area of a square object with a round disk. I have completed research to determine the direction of attack the bear takes in getting honey from hives. However, if the offender learns to attack from the sides as opposed to the top as is standard for the bear, a metal net can be used to protect the hive. The mounting of the unit can be altered for effectiveness in other applications. A disk could be mounted to the side of a

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building or to the top of a garbage can, if you're having problems in that area. The unit could be mounted at ground level in the path of an offender, such as alligators moving in an established pathway by mounting the shocking mechanism separate from the disk itself.

0023 The unit is remarkably simple in its operation. An offending animal moves the disk when they touch it. It matters not from which direction the animal touches or pushes the disk which can best be visualized in Figures 7 and 8 of the drawings. The animal can push it down or pull it up, move it in or out, or move it side to side and the rubber matting in the center will always reconfigure itself to force the round center to move in a downward direction. The oversized washer attached to the rubber matting piece on the underside of the disk will then make contact with the copper collar on the pipe. This completes the circuit required to form the number 2 switch. The battery delivers power through the relay to the coil, and to the high tension wire mounted underneath toward the outside of the disk. This electrifies the whole disk surface and delivers the shock to the offending animal.

0024 (7.) BRIEF DESCRIPTIONS OF THE DRAWINGS (IF FILED):

A note of reference for consideration before I get into the drawings, in Figures 1 through 4 the top of the disk is drawn angled forward at a downward slant for viewing purposes only. Figures 7 and 8 show the disk in its normal operating

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position. Figures 6 through 9 give details on the components on the underside of the disk and on the upper two inches (approximately) which cannot be seen with the disk pictured in its angled position.

0025 Figure 1: is a view of the unit from the front. It reveals that the disk (01) is mounted atop a ½ inch diameter pipe 12 inches long (04) at its center point; that the copper collar (06) is placed over the pipe just under the disk; and shows various wires (18-B, 18-E) for the electrical operation of the unit. It also shows the bottom of the pipe has been threaded onto the anchoring bracket (09) which has four screw holes for mounting. Additionally, the rubber matting (02) and threaded end cap for center pipe (03) are seen. These features can be seen on Figures 2, 3, and 4 also. Figure 1 provides a visual aid showing the 12 volt battery pack (08) in its holder mounted to the pipe at its tab (26) under the Plexiglas plate (19) with both the positive (13) and negative (14) posts identified on the battery. The protective housing (07) is mounted with the pipe going through it by angle iron (29). The removable front cover plate (25) on the protective housing and #1 switch (10) are also seen.

0025 Figure 2 is a view of the unit from its right side providing clarity on where the different components are mounted to the center pipe. The battery (08) and holder (20) are centered across the front of the pipe as revealed in Figure 1.

0026 Placement of components in this manner distributes the weight evenly

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making the unit stable. The coil (11) is shown going through the protective housing (07), the positive (15) and negative (16) posts, and high tension boot (18-L) and wire (18-A) on the coil are identified. The negative battery wire (18-B) can be seen going into the protective housing on way to the negative relay through the Plexiglas plate (19).

0027 Figure 3 is a view from the back of the unit and shows the battery pack (08) mounted beneath the Plexiglas plate (19) at the front of the pipe as well as pipe (04) and coil (11) going through the protective housing (07) as described in Figure 2. One can also see the ground wire (33) and rod (34) as they are attached to the center pipe by the screw (31) and electrical end hook (32). The high tension wire (18-A), boot (18-L), condenser (12), positive (15), and negative (16) posts on the coil and the back end cover (24) on the protective housing can also be seen from the back view.

0028 Figure 4 is a view of the unit from its left side. The coil (11), its positive (15) and negative (16) posts, high tension wire (18-A) and boot (18-L) held by the protective housing (07) is seen as well as a view of the #1 switch (10) and the battery pack (08) beneath the Plexiglas plate (19) with the positive battery wire (18-E) heading to the #1 switch located at the front of the unit.

0029 Figure 5 is a view of the disk from above. The disk (01) is 18 inches in diameter, the stiff rubber matting (02) is 5 inches in diameter and the 1/2 inch pipe end cap (03) threaded onto the top of the center pipe.

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0030 Figure 6 is a view of the disk from underneath. The disk and the rubber matting are seen as described in Figure 5. The center circle is the pipe (04) coming down the disk, and the oversized washer (05) riveted to the rubber matting (02) is sufficient in size to ensure matting between the washer and the pipe for insulating effect. The electrical wire (18-C) hooked to the washer near the center of the figure represents the upper half of the #2 switch. The wire hooked to the outer fringes of the disk is the high tension wire (18-A) coming from the coil.

0031 Figure 7 is a cross sectional view of the disk as it is mounted on the pipe in a level operating position with the top 1½ inches of the pipe and its various components. The disk (01) can be seen as the arm of the figure taking the space from both ends of the arm inward to where the rubber matting (02) covers the center of the pipe (04). The upper portion of the pipe (04) is shown with the copper collar (06) over it and the threaded end cap (03) in place. The stiff rubber matting (02) is riveted to both the upper and under sides of the disk (01) with the oversized washer (05) riveted to the underside of the rubber matting in such a fashion that the washer is facing downward and the rubber matting touches the copper collar itself at the center of the disk for an electrical insulating effect. The center pipe (04) is seen extending below the copper collar that has been slipped over the pipe.

0032 Figure 8 is a view described in Figure 7. It differs from Figure 7

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in that it is a view of the same parts as they would appear when in use. Both the point and direction of pressure on the disk resulting in movement will always force the pliable rubber matting (02) in the center reconfigure itself to cause the disk (01) and oversized washer (05) to move in a downward direction at or opposite to the point of contact by the offending character. This action permits the oversized washer to come into contact with the copper collar (06) thus completing the #2 switch in the unit and delivers a shock to the offending animal. An cross sectional view of the oversized washer, rubber mat and copper collar is found in Figure 9, described in paragraph 0033 of this application, and of the parts in action as found in Figure 10, described in paragraph 034of this application.

0033 Figure 9 is the cross sectional view introduced at the end of the description of drawings Figure 8, paragraph 0032 of this application. Figure 9 show how the disk (01), rubber mat (02), copper collar (06) and oversized washer (05) fit together to form the #2 action.

0034 Figure 10 is the cross sectional view of the components described in paragraph 0032 for Figure 9 in action.

0035 Figure 11 is a view of the unit in its upright position from above with the disk removed. It reveals the top of the protective housing (07), the Plexiglas covered (19) battery pack (08) with the negative (14) and positive (13) battery posts

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exposed. The positive battery post wire (18-E) to the #1 switch is revealed as well as the negative battery post wires (18-C and 18-D) forming the #2 switch entering into on the side and pass out from the top of the protective housing. The #1 switch (10) is evident—the toggle, the condenser (12), and coil (11) with the high tension wire (18-A) and boot (18-L) labeled. You see the positive battery wire (18-G) coming out from the top of the protective housing going to the positive post (15) on the coil and continuing to the positive side of the condenser (18-H). You also see the negative wires (18-J, 18-K) from the negative relay inside the protective housing to the negative post (16) of the coil, and the wire from the negative coil post passing to the negative side of the condenser (18-I). The center pipe (04) is represented by the circle in the center of the protective housing. The views of the battery and protective housing parts are not represented in the same gauge in Figures 11 and 12 as is the outline of the disk in Figure 11. In actual size, the disk measures 18 inches in diameter, the protective housing is 8 inches by 2½ inches, and the battery pack is 3¼ inches by 6½ inches.

0036 Figure 12 reveals the contents of the protective housing and is a wiring diagram. The reference numbers listed in Figure 13 can be identified from the Index of Reference Numbers For Drawings found on pages 14-15.

0037 Figure 13 is a view of the battery (08) with hookups as mounted to the Plexiglas cover plate (19). The Plexiglas plate helps hold the battery in place in the

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battery holder (08), as well as providing a way to hook up the electrical wires for the battery and serves as a cover, in addition to the disk that is over the whole thing, to protect the battery from weather issues. In both Figure 13 and Figure 14, the tab (26), the ledge (30), and the Plexiglas plate (19) are visible. The battery (08), battery holder (20), and contact springs (23) are visible. Wires (18) are shown to be put into place on the copper pop rivet (21) and screwed down by nut (22).

0038 Figure 14 is a view of the Plexiglas plate, the battery and battery holder, and the hookups as seen from the right side of the unit. A view of the left side is a mirror image of the right side as seen in Figure 14 and identification of index numbers for Figure 14 is done in Figure 13.

0039 Figure 15 is a view of the Plexiglas plate (19) on the top of the battery holder (20). The tops of the copper rivets (21) can be seen as well as the electrical wires(18). The area above the dotted line in Figure 15 is the surface that is riveted to the ledge on the battery holder.

0040 Figure 16 is a view of the battery holder (08) from the back. The top of the copper rivets (21) and the back side of the mounting tab (26) for mounting to the center pipe is all that can be seen.

0041 Figure 17 is a view of the bottom of the battery holder (08) and is unremarkable.

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0042 Figure 18 is a view of the upper 1¾ inch of the pipe without the disk in place. It shows the threading, the conduit connection ring threaded down as far as it can go which rests at the upper edge of the copper collar and the fiber washer in place to be used as the resting ledge for the disk to sit on when in place for use.

0043 Figure 19 is a view of the unit from its bottom side. All that can be seen is the bottom of the anchoring bracket (09) with its four anchoring holes visible.

0044

INDEX OF REFERENCE NUMBERS FOR DRAWINGS

Reference Number	Description
01	14 Gauge Sheet Metal Disk, 18 Inches In Diameter With Edges Turned Under (Finished)
02	Stiff Rubber Matting, 5 Inches In Diameter (Cut 2)
03	½ Inch Diameter Threaded End Cap Turned Onto Pipe
04	½ Inch Diameter Threaded Black Pipe 12 Inches Long
05	Over-sized Washer
06	½ Inch Diameter Copper Collar ¾ Inch Long, Heat Stretched Over Pipe
07	Protective Housing
08	12-Volt Battery
09	Anchoring Bracket To Receive ½ Inch Threaded Pipe
10	#1 Switch
11	Coil
12	Condenser
13	Positive Post On Battery
14	Negative Post On Battery
15	Positive Post On Coil
16	Negative Post On Coil
17	Relay
18	Wiring

**18-A High Tension Wire
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Index Of Reference Numbers For Drawings Continued

18-B	Negative Battery To Negative Relay
18-C	Negative Battery To Oversized Washer
18-D	Negative Battery To Copper Collar On Pipe
18-E	Positive Battery To #1 Switch, Toggle Switch
18-F	Positive Battery To Positive Relay
18-G	Positive Battery To Positive Coil
18-H	Positive Coil To Positive Condenser
18-I	Negative Coil To Negative Condenser
18-J	Negative Relay To Negative Coil
18-K	Negative Relay To Negative Coil
18-L	High Tension Wire Boot On Coil
19	Plexiglas Plate For Battery Hookup
20	Battery Holder
21	Copper Pop Rivets Threaded
22	Nut
23	Contact Springs On 12-Volt Battery
24	Protective Housing Back End Cover
25	Protective Housing Front End Cover, Removable
26	Battery Holder Mounting Tab
27	Conduit Connection Ring
28	Fiber Washer
29	90 Degree Bracket For Mounting Protective Housing To Pipe
30	Shelf On Battery Holder For Mounting Plexiglas Plate
31	Ground Hook Up Screw, 1/4 Inch By One Inch Long
32	Standard Electrical End Piece To Attach To Wire
33	14 Gauge Copper Wire, 18 Inches Long
34	Copper Grounding Post 2 Feet Long
35	Pop Rivets (Standard, Not Copper As In #21)
36	Screws

0045 (8.) DETAILED DESCRIPTION OF THE INVENTION: The purpose of this invention is to deliver an electrical shock to nuisance animals. It is intended to scare them away from areas they are unwelcome in or to retrain nuisance behaviors without intent of running the animal off. The drawings I have prepared

are for a unit that will mount on a flat surface. However, the unit can be set up in varying configurations, sizes, stiffness of matting, and mounting styles to use in dealing with various nuisance animals.

0046 The invention is powered by a 12-volt battery which is 4½ inches in height, 6½ inches in width and 3¼ inches in depth. It is designed to deliver an electrical shock to nuisance animals when the disk is moved in any direction. A parts list is compiled in the "Index of Reference Numbers for Drawings", on pages 14 and 15. Using the index reference numbers, constructing the unit described is accomplished in the following steps:

0047 A. Start with index reference number 04, a ½ inch diameter piece of black pipe 12 inches long, threaded down 1½ inches from the top end and 1 inch up from the bottom. Use anchoring bracket (Index Ref # 09) that has four mounting screw holes in it. Screw the bottom end of the pipe (1 inch thread end) onto the bracket and set aside.

0048 B. Use a 12-volt battery (Index Ref. # 08). Make a battery holder to fit the size of battery you use (Index Ref. # 20) as shown in Figures 13 and 14 with shelf for mounting Plexiglas plate (30) and tab (26) with hole near top center for mounting to this pipe. Cut a piece of ¼ inch Plexiglas (19) sized to fit on the shelf and over the battery you have chosen. Drill an appropriately sized hole to accommodate the size of your

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copper pop rivets (21) in the Plexiglas at points directly above the positive (13) and negative (14) battery posts. I am using belting pop rivets that are copper and have a 1/2 inch flat head on them. Thread the ends of the copper rivets (21) and get nuts (22) the same size. Insert rivets into the hole and screw the nut on to hold in place. The appropriate wires will be installed later. Drill two additional holes at the back of the Plexiglas plate (19) and through the shelf (30) on the battery holder (20) and rivet (35) the Plexiglas plate in place. Drill these holes the size you need for the pop rivets you have chosen. Set aside.

0049 C. Use 14 gauge sheet metal which has been cut into a circle which is 18 inches in diameter (01) and has had the edges finished so as not to cause injury. Use stiff rubber matting, cut two circular pieces that are 5 inches in diameter (02). The stiffness of the rubber matt will depend upon the animal you want to control. Here we are working with bears, so the matting is quite stiff. In any case, the matting has to be stiff enough to stand up to wind and not be blown about easily. If necessary, an insulated rubber strap can be used as a tie down when fastened to four equal points on the disk.

0050 D. Cut a 4-inch hole in the center of your disk (01) and a scant 1/2 inch hole in the center of your matting pieces (02) for tight fitting over

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the center pipe which will be done later. Get an oversized washer, two inches in diameter with a $\frac{3}{4}$ inch center hole (05) which is $\frac{1}{4}$ inch thick. Center and pop rivet (35) it to the underside of what will be the bottom matt. Place the two pieces of matt on the disk, one on the top side of the disk and the other on the bottom side in sandwich fashion making sure that your oversized washer is on the bottom side with the washer itself facing down as shown in Figure 18. Make sure your $\frac{1}{2}$ inch center holes are made at the exact center position of the matt you have prepared, that they are installed at the exact center point on the disk, and that they are centered to one another on the top and bottom of the disk so that you end up with the center hole in the matt sitting in the exact center position of the disk. Pop rivet in place, going through the two layers of matt and disk as shown in Figure 18. From the underside you'll see the washer, matt and disk all centered (Figure 18 of drawings), and from the top side you will see the matt and the disk centered (Figure 5 of the drawings).

- 0051 E. Construct the protective housing (08) using 2½ inch pvc house gutter drain spout 8 inches long. Drill a $\frac{1}{2}$ inch hole at the exact center point of the housing through both the top and bottom side.

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Cut a hole $2\frac{1}{4}$ inches in diameter at a point exactly centered from side to side and $1\frac{1}{2}$ inches forward from the back of the housing, cutting through both the top and bottom sides of the housing as seen in Figure 11. The $2\frac{1}{4}$ inch measurement is the diameter of the bottom portion of my coil (11). Make a tight fit. Construct two end covers (24, 25) out of a 3 inch square piece of sheet metal which has been sized down to fit the $2\frac{1}{2}$ inch protective housing size by bending the edges of the sheet metal up $\frac{1}{4}$ inch on all sides. Install back end cover (24) with rivets (35) through the protective housing on all sides. Hold the front cover for later.

0052 F. Purchase a 5-prong fuel pump relay (17) for a 12-volt system (I used Ford replacement part). Anchor to the inside of the protective housing (08) at center left, and install toggle switch (10) according to manufactures directions towards the front of the unit. Wire the unit according to wiring diagram in Figure 12 as follows:

0053 The high tension wire (18-A) from the coil (11) will go to the outer edges of the disk (01).

0054 Holes sufficient to feed the thickness of your wire through will have to be drilled in the protective housing (07) at points closest to the

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positive and negative posts on your battery for your wires to pass to the inside of the protective housing.

0055 Wire from the negative post (04) on the battery will go to the Plexiglas plate (19) and through the hole drilled in the side of the protective housing. It will then be split. One wire will go to the negative relay (18-B). Two wires will be sent to exit the protective housing, one through each of the holes drilled next to the center pipe holes (04), on top of the protective housing (07). This can be seen quite well in Figure 11. Once outside the protective housing, one wire (18-C) will be sent to the oversized washer (05) on the underside of the disk as seen in Figure 6. And the second wire (18-D) to the copper collar (06) on the center pipe (04) as seen in Figure 18. These actions complete what I call my specialized internal switch, the #2 switch. The top half of the switch is the negative wire (18-C) soldered to the oversized washer (05) and the bottom half is the negative wire (18-D) soldered to the copper collar (06). When these two points come together, the circuit is completed and power is delivered to the disk surface (01), and the offender receives the shock. The over sized washer and copper collar come into contact when an animal moves the disk shown in Figure 19.

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Additionally, since there is no power to the disk surface until called for, there is no draw on the battery.

0056 A wire from the positive post (13) on the battery (08) will be hooked to the Plexiglas plate (19) and through the hole drilled in the side of the protective housing. It will then split. One wire (18-E) will go to the #1 switch (10). Another wire (18-F) from the positive will go to the positive in the relay (17). And yet another wire (18-G) will go to the positive post (15) on the coil (11) the wire (18-H) then continuing to the positive side of the condenser (12). A negative wire (18-I) from the negative post (16) on the coil (11) will go to the negative side of the condenser (12).

0057 Two negative wires (18-J, 18-K) on the relay (17) will combine to go to the negative post (17) on the coil (11) and there will be a boot (18-L) installed on the high tension post on the coil (11) on its top which is on the outside of the protective housing (07), as can be seen better in Figure 11.

0058 G. From Figure 18 use flexible 1/2 inch copper tubing (06) that is 3/4 inch long, heated enough to stretch it over the 1/2 inch center pipe (04) to form a collar. Push the copper collar down on the pipe to where the top will sit just under the last thread of 1 1/2 inch threaded end of

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the center pipe. Thread the conduit connection ring (27) onto the pipe tight to the last thread on the pipe, followed by the fiber washer (28) to sit just above the upper edge of the copper collar (06). The rubber matting (02) will be kept up by this ring and washer combination.

0059 After all electrical components and wiring have been put in their proper place, as instructed in Figure 12 of the drawings, attach the protective housing end covers. Attach the back end cover (24) using the standard pop rivets (35) you have chosen for the job by drilling the appropriately sized holes in the end cover and protective housing, then installing. Attach the front end cover (25) in the exact fashion except that you should substitute the pop rivets with small screws (36) in sufficient length to go through the protective housing and end cover so that it will be removable should the need arise.

0060 H. Use two 90 degree brackets (29) with metal screws (36) to attach the protective housing to the center pipe in two places, one toward the front of the housing and another toward the back so that the top sits just below the $\frac{3}{4}$ inch copper collar (06). Attach the battery (08) and holder (20) with a screw (36) into the tab (36) to the front side of the center pipe (04) so that it sits just below the 90 degree bracket (29)

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which is holding the protective housing in place. Place completed disk setup over the pipe (04) to let it rest on the conduit ring (27) and fiber washer (28). Place the 1/2 inch end cap (03) over the top and tighten snugly making sure not to over tighten which could push the rubber center over the conduit ring and fiber washer combination.

- 0061 I. The last thing to do in the construction phase is to make a ground post (34). From Figure 3 you can see the approximate placing for the ground post. At a point one inch above the threading at the bottom of the center pipe (03) on the back side, drill and then tap a hole to receive a 1/4 inch screw that is about an inch long. Get an electrical end piece (32) to connect the wire to the screw (31), a piece of 14 gauge copper wire that is about 18 inches long (33) and a 2 foot long copper grounding post (34). Attach your electrical connection piece (32) to one end of the ground wire (33). Attach it onto your screw (31) and put screw into prepared hole on post. Get your copper grounding post (34) and attach the free end of the copper grounding wire (33) to it. When you put the unit into use, always place the grounding post into the ground nearby. It is also noted that the grounding wire can be lengthened or shortened if necessary to reach the ground for the job your are doing.

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0062 J. When an animal moves the disk (01), the rubber matting (02) reconfigures itself as seen in Figures 18 and 19, and the oversized washer (05) on the bottom of the disk makes contact with the copper collar (06) on the center pipe (04), and the animal receives a shock. Simply put, when the #2 switch is closed by the animal moving the disk, the battery builds ignition, produces a spark, and the animal gets shocked. More specifically, when the animal moves the disk, the points in the relay close to build up energy in the coil on the primary side which then 'gets so full' it collapses to the secondary side, the points open on the coil and sends a spark through the high tension wire to the disk and the animal who is in contact with the disk receives the shock. Since electricity follows the path of least resistance, the condenser keeps the coil from collapsing back, and blocks the electricity from taking any path but the high tension wire. The number one switch (10) is used to turn the unit completely off when not in use or when working on the unit. Do not handle the unit when the #1 switch (10) is in the on position or you will receive the shock meant for the animal.